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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,770	07/10/2003	Satoshi Mochizuki	240051US2	9477

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EXAMINER	
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ART UNIT	PAPER NUMBER
1756	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/615,770	MOCHIZUKI ET AL.	
	Examiner	Art Unit	
	Janis L. Dote	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,11-15,17-20 and 22-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,11-15,17-20 and 22-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 January 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) ~~of~~ ~~Paper No(s)/Mail Date~~. *10/13/05*.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission filed on Nov. 21, 2005, has been entered.

2. The examiner acknowledges the amendments to claims 1, 6, 11-13, 17, 18, and 22-25, and the cancellation of claims 26-29 set forth in the amendment filed on Nov. 21, 2005. Claims 1-9, 11-15, 17-20, and 22-25 are pending.

3. The rejection of claims 6-9, 11-15, 23, 24, 27, and 29 under 35 U.S.C. 112, second paragraph, set forth in the office action mailed on May 20, 2005, paragraph 9, item (2), has been withdrawn in response to the amendment to claims 6 and 12 set forth in the amendment filed on Nov. 21, 2005.

The rejections of claims 13, 18, and 22-25 under 35 U.S.C. 112, first paragraph, set forth in the office action mailed on May 20, 2005, paragraph 11, items (2) and (3), have been withdrawn in response to the amendments to claims 13, 18,

and 22-25 set forth in the amendment filed on Nov. 21, 2005. The examiner notes that according to the instant specification, the definition of the term "degree of roundness" recited in instant claims 22-25 appears to be only applicable when the average degree of roundness is determined by an image processing software for statistically analyzing photographs of particles obtained from a scanning electron microscope or a transmission electron microscope. See the instant specification, page 36, line 12, to page 37, line 11.

The objections to claims 17 and 29 set forth in the office action mailed on May 20, 2005, paragraph 12, have been withdrawn in response to the amendment to claim 17 and the cancellation of claim 29 set forth in the amendment filed on Nov. 21, 2005.

The rejections under 35 U.S.C. 103(a) of claims 1-9, 17-20, 22, 23, and 25 over US 6,177,223 B1 (Hashimoto) combined with US 6,403,271 B1 (Suzuki), as evidenced by applicants' admissions I, and of claims 12-15 and 24 over US 2003/0118366 (Nukada) combined with Hashimoto and Suzuki, set forth in the office action mailed on May 20, 2005, paragraphs 22 and 23, have been withdrawn in response to the amendments to claims 1, 6, 12, and 17 set forth in the amendment filed on Nov. 21, 2005. Those amendments to claims 1, 6, 12, and 17 added the limitation that the toner parameters SF-1 and SF-2 satisfy the inequality

SF-1 < SF-2. Hashimoto discloses magenta-colored toner particles having a shape factor SF-1 of 127 and a shape factor SF-2 of 123, which are within the SF-1 and SF-2 value ranges recited in the instant claims. However, Hashimoto does not disclose a toner having shape factors SF-1 and SF-2 values that are within the numerical ranges recited in the instant claims and that satisfy the inequality SF-1 < SF-2 recited in the instant claims.

4. The disclosure is objected to because of the following informalities:

The use of trademarks, e.g. Henschel mixer [sic: HENSCHEL MIXER] in the amended paragraph filed on Jan. 10, 2005, beginning at page 109, lines 12-25, of the specification, has been noted in this application. The trademarks should be capitalized wherever they appear and be accompanied by the generic terminology. This example is not exhaustive. Applicants should review the entire specification for compliance.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any

manner which might adversely affect their validity as trademarks.

Appropriate correction is required.

Applicant's arguments filed on Nov. 21, 2005, have been fully considered but they are not persuasive.

Applicants assert that the amendment to the specification filed on Nov. 21, 2005, overcomes the objection. However, for the reasons discussed in the objection above, the amendment file on Nov. 21, 2005, did not capitalize all the trademarks disclosed in the instant specification.

5. The examiner notes that the instant specification at page 69, lines 9-23, discloses that the parameters SF-1 and SF-2 recited in the instant claims are determined from the following equations 1 and 2:

Equation 1. SF-1 = ((absolute maximum length of a toner particle)^2/ projection area of a toner particle) x (π/4) X 100

Equation 2. SF-2 = (peripheral length of toner particle)^2/ (projection area of a toner particle) x (π/4) X 100

In other words, the "area of the particle of the base toner" in the formulas recited in the instant claims is a "projection area" of the toner base.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-9, 11-15, and 17-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-9, 11-15, and 17-20 are indefinite in the phrase "average degree of roundness greater than or equal to 0.98 and less than or equal to 0.996" because it is not clear what is meant by the term "average degree of roundness." Moreover, neither the instant specification nor the claims define the term "average degree of roundness." See the instant specification at page 36, line 11, to page 37, line 11, which discloses that the "degree of roundness can be measured with various methods. For example, the degree of roundness may be obtained by using an image processing software for statistically analyzing photographs obtained from a scanning electron microscopy, and then, by obtaining an arithmetic mean of degree of roundness

according to the following formula [disclosed at page 37, lines 1-11]" (emphasis added).

Applicants' arguments filed on Nov. 21, 2005, have been fully considered but they are not persuasive.

Applicants assert that the claimed term "average degree of roundness" is definite and that the meaning of the term is apparent from the specification at page 36, line 11, to page 37, line 11. Applicants further assert that "the pending claims must be given the broadest reasonable interoperation consistent with the specification."

Applicants' assertions are not persuasive. As discussed in the rejection, the specification does not define the term "average degree of roundness" recited in instant claims 1-9, 11-15, and 17-20. Contrary to applicants, the meaning the term would not be apparent to a person having ordinary skill in the art from the disclosure at page 36, line 11, to page 37, line 11. That disclosure merely states that the "average degree of roundness" may be determined by the methods disclosed at page 36, line 11, to page 37, line 11. Applicants have not provided any objective evidence showing that the term "average degree of roundness" has a well-known definition in the toner art, e.g., in the form of a standard textbook or a Rule 132 declaration from an expert in the art that provides a well-known

definition in the toner art for the term "average degree of roundness." "The meaning of every term used in a claim should be apparent from the prior art or from the specification and drawings at the time the application is filed. Applicants need not confine themselves to the terminology used in the prior art, but are required to make clear and precise the terms that are used to define the invention whereby the metes and bounds of the claimed invention can be ascertained" (emphasis added). MPEP 2173.05(a).1 (Rev. 3, Aug. 2005).

Applicants further assert that the term "average degree of roundness" has a well known definition in the toner art, as shown in US 6,100,000 to Anno.

However, Anno at col. 11, lines 11-17, discloses that the "[i]n the present specification, the average degree of roundness . . . is an average value calculated by the . . . equation: Average degree of roundness = Peripheral length of circle equal to projection area of a particle/ Peripheral of particle projected image" (emphasis added). Anno at col. 11, lines 18-24, further discloses that "[i]n the present invention, with respect to the average degree of roundness, 'Peripheral length of circle equal to projection area of a particle' and 'Peripheral of particle projected image' are presented by values obtained through measurements carried out by a flow-type

particle image analyzer (EPIA-1000 or EPIA-2000, made by Toa Iyoudenshi K.K.) in an aqueous dispersion system." Thus, according to Anno, the Anno definition of "average degree of roundness" appears to be only applicable for the invention of Anno. It is not a general definition in the toner art, as asserted by applicants. Anno is not a standard text in the toner art. Furthermore, the Anno definition is not the same as the definition of the average degree of roundness used by the method disclosed in the instant specification as one of the examples of the various methods used to determine the "average degree of roundness." That method, an image processing software for statistically analyzing photographs obtained from a scanning electron microscopy, uses the formula defining the average degree of roundness as the "peripheral length of proportional circle/ peripheral length of the projected particle image," where the "peripheral length of the projected particle image" means the "length of an outlined portion obtained by connecting edge points of a binarized particle image" of the inorganic particle, and the "peripheral length of proportional circle" means the "outer peripheral length of a circle having an area equal to an area of the binarized particle image" of the inorganic particle. Specification, page 36, line 12, to page 37, line 11. Accordingly, the rejection stands.

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 1-9, 11-15, 17-20, and 22-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

(1) Instant claim 11 recites that "the coloring agent includes colorants having different colors."

The originally filed specification does not provide an adequate written description of said coloring agent. The originally filed specification at page 51, line 10, to page 52, line 19, discloses that the "various conventional dyes and pigments may be used as the colorant of the toner, such a Carbon black, Nigrosine dye, Iron black, Naphthol yellow S . . . and mixtures thereof." In other words, the originally filed

specification discloses that the colorant of the toner may comprise mixtures of the named colorants disclosed at page 51, line 12, to page 52, line 18. The originally filed specification does not disclose that the coloring agent includes "colorants having different colors" as broadly recited in instant claim 11. The term "colorants having different colors" is broader than the disclosed mixtures of the named colorants disclosed at page 51, line 12, to page 52, line 18, of the originally filed specification, because the term includes mixtures of colorants that are not the named colorants disclosed at page 51, line 12, to page 52, line 18, of the originally filed specification.

(2) Instant claims 1, 6, 12, and 17 and claims dependent thereon recite that the base toner SF-1 value and SF-2 value satisfy the inequality SF-1 < SF-2.

The originally filed specification does not provide an adequate written description of said inequality. There is no general disclosure in the originally filed specification that the SF-1 value has to be less than the SF-2 value as recited in the instant claims. Nor is there any disclosure in the originally filed specification of any advantage associated with setting the value of SF-1 to be less than the value of SF-2. Nor is there any disclosure of problems associated with setting

the value of SF-1 to be greater than or equal to the value of SF-2. The originally filed specification merely discloses that the base toner has a SF-1 value and a SF-2 value that satisfy the relations $105 \leq SF\text{-}1 \leq 130$ and $120 \leq SF\text{-}2 \leq 180$. See the originally filed specification, page 21, lines 5-6, page 22, line 12, page 24, line 2, and page 25, line 11.

Applicants' arguments filed on Nov. 21, 2005, have been fully considered but they are not persuasive.

(1) Applicants assert that the specification indicates that "a 'colorant' is a 'coloring agent' that may include conventional dyes and pigments having different colors" such as those disclosed at page 51, line 10, to page 52, line 22.

However, as discussed in the rejection in item (1) above, the originally filed specification at page 51, line 10, to page 52, line 19, discloses that the "various conventional dyes and pigments may be used as the colorant of the toner, such a Carbon black, Nigrosine dye, Iron black, Naphthol yellow S . . . and mixtures thereof." In other words, the originally filed specification at page 51, line 10, to page 52, line 19, lists a number of named pigments and dyes that can be used as a toner colorant. The specification further discloses that a mixture of those named pigments and dyes may be used as a toner colorant. The originally filed specification does not disclose that the

coloring agent comprises any "colorants having different colors" as broadly recited in instant claim 11. The recitation "colorants having different colors" recited in instant claim 11 is broader than the disclosure in the originally filed specification, because it includes "colorants" that are not included in the list of named colorants disclosed at page 51, line 12, to page 52, line 19, of the originally filed specification.

(2) Applicants assert that the specification has been amended to provide written description for the relation SF-1 < SF-2. Applicants assert that the specification amendments find support in the originally filed specification at least at page 107, lines 9-20, page 108, lines 1-6, and the tables at pages 111 and 112.

However, the amended paragraphs at page 107, lines 9-20, and at page 108, lines 1-6, of the specification, filed on Nov. 21, 2005, merely describe what is already shown from the reported particular SF-1 and SF-2 values for the exemplified black toners 1 to 6. The reported particular values of SF-1 and SF-2 reported in the specification examples of the originally filed specification only provide antecedent basis for those particular toners exemplified in the examples. Moreover, comparative examples 1 and 2 exemplify toners that satisfy the

relationship SF-1 < SF-2. See Toners 2 and 6 at pages 111 and 112. Toners 2 and 6 do not have a SF-1 value and a SF-2 value that satisfy the relations $105 \leq SF\text{-}1 \leq 130$ and $120 \leq SF\text{-}2 \leq 180$, respectively. Accordingly, the amended paragraphs do not provide an adequate written description of the limitation SF-1 < SF-2 for the toners broadly recited in the instant claims.

As discussed in the rejection above, there is no general disclosure in the originally filed specification that the parameter factor SF-1 has to be less than the parameter SF-2. The specification merely discloses that the base toner has a SF-1 value and a SF-2 value that satisfy the relations $105 \leq SF\text{-}1 \leq 130$ and $120 \leq SF\text{-}2 \leq 180$. The originally filed specification does not disclose that there are any advantages associated with setting the value of SF-1 to be less than the value of SF-2. Nor does the originally filed specification disclose problems associated with setting the value of SF-1 to be greater than or equal to the value of SF-2.

10. Claims 1-9, 11-15, 17-20, and 22-25 are objected to because of the following informalities:

In claims 1, 6, 12, and 17, the typographic error "our" in the phrase "a base toner . . . having a particle diameter less than our equal to 7 μm" (emphasis added).

Appropriate correction is required.

11. In the interest of compact prosecution, the examiner has interpreted that the average degree of roundness recited in instant claims 1, 6, 12, and 17 as the arithmetic mean of the degree of roundness of the inorganic fine particles, where the degree of roundness is defined as a peripheral length of a circle having an area equal to an area of a binarized particle image of an inorganic particle divided by the length of an outlined portion obtained by connecting the edge points of the binarized particle image of the inorganic particle. Antecedent basis for the examiner's definition can be found at page 36, lines 16-17, and page 37, lines 1-11, of the instant specification.

12. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

13. Claims 1, 2, 5-7, 11, 17, 18, 22, 23, and 25 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative,

under 35 U.S.C. 103(a) as obvious over US 5,827,632 (Inaba'632), as evidenced by applicants' admission in the instant specification at page 37, lines 11-22, and the tables at page 115, embodiment 7, and the accompanying text (applicants' admissions I) and Grant & Hackh's Chemical Dictionary, 5th edition, page 357.

Inaba'632 discloses a developer comprising a magnetic carrier and a toner. The toner comprises toner particles comprising a binder resin and a colorant, hydrophobic inorganic fine powder a-1, and hydrophobic silicon compound fine powder (A). The toner particles have a shape factor SF-1 of 109 and a shape factor SF-2 of 120. The shape factors SF-1 and SF-2 are determined in the same manner as recited in the instant claims. Col. 7, line 57, to col. 8, line 6. The hydrophobic silicon compound fine powder (A) comprises silica particles and has an average particle diameter of 40 nm. Col. 27, lines 5-8; Table 1, hydrophobic silicon compound fine powder (A); and example 7 at cols. 31-32. The toner particles have a weight average particle diameter of 7.7 μm. The hydrophobic silicon compound fine powder (A) has an average particle diameter of 40 nm that meets the particle size limitations recited in instant claims 1, 6 and 17. The shape factors SF-1 and SF-2 are within the respective ranges recited in instant claims 1, 6,

and 17. The Inaba'632 shape factors SF-1 and SF-2 also satisfy the inequality SF-1 < SF-2 recited in instant claims 1, 6, and 17. Inaba'632 further teaches that the colorant can be a black colorant that comprises a mixture of yellow, magenta, and cyan colorants. Col. 5, lines 15-16. Thus, the Inaba'632 black colorant meets the limitation "coloring agent includes colorants having different colors" recited in instant claim 11.

Inaba'632 further discloses an image forming apparatus comprising a developing unit **74** comprising the developer described above and a transfer unit **77**. Fig. 7; col. 21, line 45, to col. 24, line 29. The apparatus meets the components recited in instant claim 6. Inaba'632 also discloses an image forming method comprising the steps recited in instant claim 17, where the developer described above is used to develop the latent image formed on the photoconductor. Fig. 7, col. 21, line 45, to col. 24, line 29; and Table 5 at col. 35, example 7.

Inaba'632 does not explicitly disclose that its toner particles have a particle diameter less than or equal to 7 μm recited in instant claims 1, 6, and 17. However, as discussed above, the toner particles in example 7 of Inaba'632 have a weight average particle diameter of 7.7 μm. A weighted average or mean is the "quotient obtained by dividing the sum of ma + nb + oc + . . . by m + n + o + . . ." See Grant & Hackh's

Chemical Dictionary, page 357. Thus, a weight average particle diameter is the proportional average or mean of particle diameters multiplied by the weight percentage of particles having said particle diameters. Because the Inaba'632 toner particles have a weight-average particle of 7.7 μm, it is reasonable to conclude that the toner particles comprise toner particles having particle diameters of 7 μm or less, thereby meeting the limitation that the base toner has a particle diameter of less than or equal to 7 μm as recited in instant claims 1, 6, and 17. The burden is on applicants to prove otherwise. In re Fitzgerald, 205 USPQ 594 (CCPA 1980).

Inaba'632 does not disclose that the hydrophobic silicon compound fine powder (A) has an average degree of roundness as recited in instant claims 1, 6, 17, 22, 23, and 25. However, the instant specification at page 37, lines 11-23, discloses that "[i]n a case where the average degree of roundness of the silica particle is below 0.95, fluidity of [the] toner, supply property of [the] toner, and preservation property of [the] toner shall decrease. In a case where the average degree of roundness of the silica particle is above 0.996, retaining silica particles on the toner surface shall become difficult, affinity between the silica particles and the toner shall decrease, the silica particles shall be unable to function as

external additives, storing property and chargeability with respect to environment shall deteriorate, to thereby affecting the image." The instant specification shows that when a developer comprises inorganic fine particles having an average degree of roundness of 0.990, the developer exhibits good cleaning properties and toner transfer rate, and provides images without blanks. See the tables at page 115, embodiment 7, and the accompanying text. The developer in example 7 of Inaba'632 exhibits stable charging properties under several different environmental conditions. The Inaba'632 developer exhibits good anti-blocking properties (i.e., storing or preservation property), and high transfer efficiency. The developer also exhibits good cleaning properties and provides images without white dropout. See Table 5 at col. 35, example 7, and the accompanying text. These are the properties sought by applicants. Thus, because the Inaba'632 developer in example 7 appears to exhibit the properties sought by applicants, it is reasonable to presume that the Inaba'632 inorganic fine powder (A) has an average roundness as recited in instant claims 1, 6, 17, 22, 23, and 25. The burden is on applicants to prove otherwise. Fitzgerald, supra.

14. Claims 12, 13, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0118366 (Nukada) combined with Inaba'632, as evidenced by applicants' admissions I and Grant & Hackh's Chemical Dictionary, 5th edition, page 357.

Nukada discloses a process cartridge comprising a particular photoreceptor. Nukada discloses that the cartridge may further contain units appropriately selected from the charging unit, the exposing unit, the developing unit, the transferring unit, and the cleaning unit previously described in Nukada. Paragraph 0115, lines 1-7. Nukada further discloses that the developing unit may be a unit in which development is conducted with a two-component developer that comprises a toner and carrier. Paragraph 0110, lines 1-12. Thus, Nukada teaches a process cartridge that comprises a charging unit, an exposing unit, a developing unit, a transfer unit, and a cleaning unit.

Nukada does not disclose the use of a developer as recited in the instant claim. However, as discussed supra, Nukada discloses that the developing unit may comprise a developer comprising a toner and a carrier.

Inaba'632, as evidenced by applicants' admissions I and Grant & Hackh's Chemical Dictionary, 5th edition, page 357, discloses a developer comprising a toner and a carrier as described in paragraph 13, supra. The developer meets the

developer limitations recited in instant claims 12, 13, and 24. The discussions of Inaba'632, applicants' admissions I, and Grant & Hackh's Chemical Dictionary, 5th edition, page 357, in paragraph 13 above are incorporated herein by reference. According to Inaba'632, the developer has excellent performance in continuous image formation on a large number of sheets. Col. 2, lines 21-24, and Table 5, example 7.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Inaba'632, to use the developer in example 7 of Inaba'632 as the developer in the process cartridge disclosed by Nukada. That person would have had a reasonable expectation of successfully obtaining a process cartridge that provides continuous image formation on a large number of sheets.

15. Claims 1, 4-6, 9, 11, 17, 20, 22, 23, and 25 are rejected under 35 U.S.C. 103(a) as obvious over Inaba'632, as evidenced by applicants' admissions I and Grant & Hackh's Chemical Dictionary, 5th edition, page 357.

Inaba'632, as evidenced by Grant & Hackh's Chemical Dictionary, 5th edition, page 357, discloses a developer, an image forming apparatus, and method of forming an image, as

described in paragraph 13 above, which is incorporated herein by reference.

As discussed in paragraph 13, the developer disclosed by Inaba'632 comprises toner particles, hydrophobic inorganic fine powder a-1, and hydrophobic silicon compound fine powder (A). The hydrophobic silicon compound fine powder (A) comprises silica particles and has an average particle diameter of 40 nm. The hydrophobic inorganic fine powder a-1 has an average particle diameter of 51 nm. Table 1 at col. 30, fine powder a-1. The fine powder a-1 meets the inorganic fine powder particle size limitation recited in instant claims 1, 6, and 17. The hydrophobic silicon compound fine powder (A) meets the "further inorganic fine particles" limitation recited in instant claims 4, 9, and 20.

Inaba'632 does not disclose that the hydrophobic inorganic fine powder a-1 has an average degree of roundness as recited in instant claims 1, 6, 17, 22, 23, and 25. However, the instant specification at page 37, lines 11-23, discloses that if the degree of roundness is below 0.95, "fluidity of [the] toner, supply property of [the] toner, and preservation property of [the] toner shall decrease"; and that if the average degree of roundness is above 0.996, "retaining silica particles on the toner surface shall become difficult, affinity between the

silica particles and the toner shall decrease, the silica particles shall be unable to function as external additives, storing property and chargeability with respect to environment shall deteriorate, to thereby affecting the image." The discussion of the instant specification in paragraph 13 above is incorporated herein by reference. The developer in example 7 of Inaba'632 exhibits stable charging properties under several different environmental conditions. The Inaba'632 developer exhibits good anti-blocking properties (i.e., storing or preservation property), and high transfer efficiency. The developer also exhibits good cleaning properties and provides images without white dropout. See Table 5 at col. 35, example 7, and the accompanying text. These are the properties sought by applicants. Thus, because the Inaba'632 developer in example 7 appears to exhibit the properties sought by applicants, it is reasonable to presume that the inorganic fine powder a-1 has an average roundness as recited in instant claims 1, 6, 17, 22, 23, and 25. The burden is on applicants to prove otherwise. Fitzgerald, supra.

16. Claims 12, 15, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nukada combined with Inaba'632, as

evidenced by applicants' admissions I and Grant & Hackh's Chemical Dictionary, 5th edition, page 357.

Nukada discloses a process cartridge as described in paragraph 14 above, which is incorporated herein by reference. Nukada does not disclose the use of a developer as recited in the instant claims.

Nukada does not disclose the use of a developer as recited in the instant claims. However, as discussed in paragraph 14 above, Nukada discloses that the developing unit may comprise a developer comprising a toner and a carrier.

Inaba'632, as evidenced by applicants' admissions I and Grant & Hackh's Chemical Dictionary, 5th edition, page 357, discloses a developer comprising a toner and a carrier as described in paragraph 15, supra. The developer meets the developer limitations recited in instant claims 12, 15, and 24. The discussions of Inaba'632, applicants' admissions I, and Grant & Hackh's Chemical Dictionary, 5th edition, page 357, in paragraph 15 above are incorporated herein by reference. According to Inaba'632, the developer has excellent performance in continuous image formation on a large number of sheets. Col. 2, lines 21-24, and Table 5, example 7.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Inaba'632, to use

the developer in example 7 of Inaba'632 as the developer in the process cartridge disclosed by Nukada. That person would have had a reasonable expectation of successfully obtaining a process cartridge that provides continuous image formation on a large number of sheets.

17. Applicants' arguments filed on Nov. 21, 2005, with respect to the rejections over Inaba'632 set forth in paragraphs 13-16 above have been fully considered but they are not persuasive.

Applicants' assert that Inaba'632 does not teach or suggest a base toner having a "particle diameter less than our equal to 7 μm," and satisfying the SF-1 and SF-2 limitations recited in the instant claims. Applicants assert that the toner in example 7 of Inaba'632 has "a particle diameter of 7.7 μm" and does not describe "any other toner including the features of the claimed invention."

However, as discussed in paragraph 13 above, the toner particles in example 7 of Inaba'632 have a weight average particle diameter of 7.7 μm. For the reasons discussed in paragraph 13 above, it is reasonable to conclude that the toner particles in example 7 of Inaba'632 comprise particles having particle diameters of 7 μm or less, thereby meeting the limitation that the base toner has a particle diameter of less

than or equal to 7 μm recited in the instant claims. The preponderance of the evidence on the present record favors the rejections. Accordingly, the rejections over Inaba'632 in paragraphs 13-16 stand.

18. Claims 1-5, 17-20, 22, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,712,072 (Inaba'072), as evidenced by and Grant & Hackh's Chemical Dictionary, 5th edition, page 357, combined with US 6,403,271 B1 (Suzuki), as evidenced by applicants' admission I.

Inaba'072 discloses developers comprising a magnetic carrier and a color toner. The color toner comprises: color toner particles, which comprise a binder resin, a charge control agent, a release agent, and a colorant; and hydrophobic silica powder. Col. 17, line 59, to col. 18, line 52, and example 9 at col. 20, lines 40-44, and in Table 3 at cols. 19-20. The cyan-colored toner particles in example 9 have a weight-average particle diameter of 6.3 μm. The cyan-colored toner particles in example 9 have a shape factor SF-1 of 115 and a shape factor SF-2 of 120. The shape factors SF-1 and SF-2 are determined in the same manner as recited in the instant claims. Col. 13, lines 10-22 and 50-62. The shape factors SF-1 and SF-2 are within the respective ranges recited in instant claims 1 and 17.

The Inaba'072 shape factors SF-1 and SF-2 also satisfy the inequality SF-1 < SF-2 recited in instant claims 1 and 17. Inaba'072 further teaches that the colorant can be a black coloring agent that comprises a mixture of yellow, magenta, and cyan coloring agents. Col. 10, lines 32-34. Thus, the Inaba'072 black coloring agent meets the limitation "coloring agent includes colorants having different colors" recited in instant claim 11.

Inaba'072 also discloses an image forming method comprising the steps recited in instant claim 17, but for the use of a developer comprising the particular inorganic fine particles recited in instant claim 17. Col. 1, lines 11-47, and col. 16, lines 4-9, and 18-46.

Inaba'072 does not explicitly disclose that its toner particles have a particle diameter less than or equal to 7 μm recited in instant claims 1 and 17. However, as discussed above, the toner particles in example 9 of Inaba'072 have a weight average particle diameter of 6.3 μm. A weighted average or mean is the "quotient obtained by dividing the sum of ma + nb + oc + . . . by m + n + o + . . ." See Grant & Hackh's Chemical Dictionary, 5th edition, page 357. Thus, a weight average particle size is the proportional average or mean of particle diameters multiplied by the weight percentage of

particles having said particle diameters. Because the Inaba'072 toner particles have a weight-average particle of 6.3 μm, it is reasonable to conclude that the toner particles comprise toner particles having particle diameters of 7 μm or less, thereby meeting the limitation that the base toner has a particle diameter of less than or equal to 7 μm as recited in instant claims 1 and 17. The burden is on applicants to prove otherwise. Fitzgerald, supra.

Inaba'072 does not exemplify the use of the inorganic fine particles as recited in instant claims 1 and 17. However, as discussed above, Inaba'072 developer comprises an externally added hydrophobic silica powder. Inaba'072 does not limit the type of silica powder used. Inaba'072 teaches that "any flowability improving agent, such as silica . . . " may be used in its toner. Col. 14, lines 41-42.

Suzuki teaches developers comprising toner particles combined with (1) monodisperse hydrophobic spherical silica particles B obtained by a sol-gel method having an average particle size of 80 nm; and (2) inorganic particles obtained by subjecting metatitanic acid ($TiO(OH)_2$) to an isobutyltrimethoxysilane treatment, which have an average particle size of 35 nm. See monodisperse spherical silica B at col. 17, lines 35-40, and example 2 at col. 22. The hydrophobic

spherical silica particles B taught by Suzuki meet the particle size and compositional limitations regarding the inorganic fine particles recited in instant claims 1-3 and 17-19. The inorganic particles obtained by subjecting metatitanic acid ($TiO(OH)_2$) to an isobutyltrimethoxysilane treatment meet the "further inorganic fine particles" limitation recited in instant claims 4 and 20. According to Suzuki, the use of the hydrophobic spherical silica particles B provides a developer in which "the toner flowability, charging property, the developing property, the transferring property, and the fixing property are simultaneously satisfied in a long period of time." Col. 4, line 48, to col. 5, line 5. Suzuki further discloses that the use of the inorganic particles comprising metatitanic acid ($TiO(OH)_2$) can provide developers that are excellent in charging property, environment stability, flowability, caking resistance, stable negative charging property, and "stable image quality maintenance property." Col. 10, lines 39-43.

Suzuki does not disclose that the monodisperse hydrophobic spherical silica particles B have an average degree of roundness as recited in instant claims 1, 17, 22, and 25. However, the instant specification at page 37, lines 11-23, discloses that if the degree of roundness is below 0.95, "fluidity of [the] toner, supply property of [the] toner, and preservation property of

[the] toner shall decrease"; and that if the average degree of roundness is above 0.996, "retaining silica particles on the toner surface shall become difficult, affinity between the silica particles and the toner shall decrease, the silica particles shall be unable to function as external additives, storing property and chargeability with respect to environment shall deteriorate, to thereby affecting the image." The discussion of the instant specification in paragraph 13 above is incorporated herein by reference. As discussed supra, the Suzuki hydrophobic spherical silica particles B are obtained by a process within the process limitations recited in claims 3 and 19. Suzuki teaches that the use of the hydrophobic spherical silica particles B provides a developer in which "the toner flowability, charging property, the developing property, the transferring property, and the fixing property are simultaneously satisfied in a long period of time." Col. 4, line 48, to col. 5, line 5. Suzuki teaches that because the hydrophobic spherical silica particles are monodisperse and spherical, the particles are uniformly dispersed on the surface of the toner particles. Col. 7, lines 46-49. Suzuki shows that when the developer comprises the hydrophobic spherical silica particles B, the developer exhibits good charging properties under different environmental conditions. The developer also

exhibits good transfer efficiency. See Table 5 at col. 35, example 2, and the accompanying text. The properties sought by Suzuki are the same properties sought by applicants. Thus, because the Suzuki hydrophobic spherical silica particles B are obtained by a process within the process limitations recited in instant claims 3 and 19, and because developers comprising the Suzuki hydrophobic spherical silica particles B appear to exhibit the properties sought by applicants, it is reasonable to presume that the Suzuki hydrophobic spherical silica particles B have an average roundness as recited in instant claims 1, 17, 22, and 25. The burden is on applicants to prove otherwise. Fitzgerald, supra.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Suzuki, to use the hydrophobic spherical silica particles B and metatitanic acid inorganic particles taught by Suzuki as the external additive in the developer disclosed by Inaba'072. That person would have had a reasonable expectation of successfully obtaining color developers having satisfactory toner flowability, charging property, the developing property, the transferring property, and the fixing property for a long period of time. It also would have been obvious for that person to use the resultant developers in the image forming method disclosed by Inaba'072,

because that person would have had a reasonable expectation of successfully obtaining an image forming method that provides satisfactory toner images for a long period of time.

19. Claims 6-9, 11-15, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nukada combined with Inaba'072, as evidenced by Grant & Hackh's Chemical Dictionary, 5th edition, page 357, combined with Suzuki, as evidenced by applicants' admissions I.

Nukada discloses a process cartridge as described in paragraph 14 above, which is incorporated herein by reference.

Nukada also discloses an imaging apparatus that comprises a particular photoreceptor **10**, i.e., an electrostatic latent image carrier; a contact charging device **11**; a laser exposing optical system **12**, i.e., an irradiator; a developing unit **13**; a transfer unit **14**; a fixing roll unit **16**; and a cleaning unit **15** comprising a cleaning blade. Fig. 7, and paragraphs 0112-0113. Nukada discloses that the developing unit may be a unit in which development is conducted with a two-component developer that comprises a toner and carrier. Paragraph 0110, lines 1-12.

Nukada does not disclose the use of a developer as recited in the instant claims. However, as discussed in paragraph 14 and above, Nukada discloses that the developing unit in the

process cartridge and in the image forming apparatus may comprise a developer comprising a toner and a carrier.

The teachings of Inaba'072, as evidenced by Grant & Hackh's Chemical Dictionary, 5th edition, page 357, combined with the teachings of Suzuki, as evidenced by applicants' admission I, render obvious a developer as described in paragraph 18 above, which is incorporated herein by reference. The developer meets the developer limitations recited in instant claims 6-15, 23, and 24. In addition, according to Inaba'072, its color developer has a "large coloring strength," excellent offset resistance on fixing and blocking resistance. Col. 2, lines 61-67; and Table 4 at cols. 21-22, example 9.

It would have been obvious for a person having ordinary skill in the art to use the developer rendered obvious over the combined teachings of Inaba'072 and Suzuki as the developer in the process cartridge and the image forming apparatus disclosed by Nukada. That person would have had a reasonable expectation of successfully obtaining a process cartridge and an image forming apparatus that provide toner images that have a large coloring strength and excellent offset resistance on fixing as disclosed by Inaba'072, and that provide satisfactory images for a long period of time as disclosed by Suzuki.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janis L. Dote whose telephone number is (571) 272-1382. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Mark Huff, can be reached on (571) 272-1385. The central fax phone number is (571) 273-8300.

Any inquiry regarding papers not received regarding this communication or earlier communications should be directed to Supervisory Application Examiner Ms. Claudia Sullivan, whose telephone number is (571) 272-1052.

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JLD
Dec. 5, 2005

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